

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2141901****Date: 06/06/2017****Subject Name: Mechanical Measurement & Metrology****Time: 10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

MARKS

Q.1	Short Questions	14
1	A Systematic errors are (a) randomly distributed (b) regularly repetitive in nature (c) unknown error (d) of unpredictable error	
2	A feeler gauge is used to check (a) radius (b) screw pitch (c) surface roughness (d) thickness of clearance	
3	The thickness of light gauge sheet steel can be best checked with a (a) Steel scale (b) depth gauge (c) micrometer (d) caliper	
4	The least count of a metric vernier caliper having 25 divisions on vernier scale, matching with 24 divisions of main scale (1 main scale division = 0.5mm) is (a) 0.05mm (b) 0.01mm (c) 0.02mm (d) 0.001mm	
5	Elements of the indicating device carrying the scale is called (a) dial (b) housing (c) index (d) Frame	
6	The purpose of ratchet screw in micrometer screw gauge is (a) to lock a dimension (b) to impart blow motion (c) to maintain sufficient and uniform measuring pressure (d) to allow zero adjustment	
7	External taper can be accurately measured with the help of (a) sine bar and slip gauges (b) dividing head (c) combination set (d) clinometer	
8	Gear tooth caliper is used to find the chordal thickness of the following type of gear tooth (a) spur gear (b) helical gear (c) worm gear (d) bevel gear	
9	Circular scale of the micrometer is marked on (a) anvil (b) barrel (c) ratchet (d) thimble	
10	Error of measuring equipment is (a) the closeness with which a measurement can be read directly from a measuring instrument (b) a measure of how close the reading is to the true size (c) the difference between measured value and actual value (d) the smallest change in measured that can be measured	

- 11 Precision is (a)the repeatability of a measuring process(b)agreement of the result of a measurement with the true value of the measured quantity (c) the ability of an instrument to reproduce same reading under identical conditions(d)error of judgment in reading an observation
- 12 The two slip gauges in precision measurement are joined by (a) assembling (b) sliding (c) adhesion (d)wringing
- 13 Profilometer is an instrument used to measure (a)gear involute(b)thread profile(c)taper(d)surface roughness
- 14 The ‘best size wire’ for measuring the effective diameter of threads is of diameter (a) $p \sec \theta / 2$ (b) $p \cos \theta / 2$ (c) $p \sec \theta$ (d) $2p \sec \theta$. (Where p = pitch of thread and θ = semi-angle of thread)
- Q.2** (a) Explain the term “ Calibration”. **03**
 (b) Define accuracy and precision. **04**
 (c) Describe errors and sources of errors. **07**
- OR**
- (c) Describe with neat sketch the construction and working of a micrometer. **07**
- Q.3** (a) What is least count? How is it determined in case of vernier caliper? **03**
 (b) Explain Eddy current Dynamometer. **04**
 (c) State the various types of load cells and explain any one of them with neat sketch. **07**
- OR**
- Q.3** (a) What are different types of transducers? **03**
 (b) Write a short note on seismic accelerometer. **04**
 (c) Explain the principles and types of thermocouples. **07**
- Q.4** (a) Distinguish between line standard and End standard. **03**
 (b) Give comparison between involute and cycloidal gears. **04**
 (c) Describe with neat sketch the construction and use of Gear tooth vernier caliper. **07**
- OR**
- Q.4** (a) Classify screw threads. **03**
 (b) Compare RTD and Thermistors as temperature measuring device. **04**
 (c) Derive the expression for best wire size. **07**
- Q.5** (a) What are the important features of a good comparator. **03**
 (b) Define : (1) primary texture and (2) secondary texture **04**
 (c) Sketch and describe the construction and working of Tomlinson surface roughness tester. **07**
- OR**
- Q.5** (a) Write the advantages of Coordinate measuring machines **03**
 (b) State the use of (i) Slip gauges , (ii) Dial indicator. **04**
 (c) Explain Tool Maker’s Microscope. **07**
